Name _____ Date _____

Instructor _____ Period _____

Project 3: Job 8—Diagnose Steering and Suspension Problems

After completing this job, you will be able to diagnose steering and suspension problems.

Instructions

As you read the job instructions, answer the questions and perform the tasks. Print your answers neatly and use complete sentences. Consult the proper service literature and ask your instructor for help as needed.

Warning

Before performing this job, review all pertinent safety information in the text and discuss safety procedures with your instructor.

Procedures

☐ 1. Obtain a vehicle to be used in this job. Your instructor may direct you to perform this job on a shop vehicle.

☐ 2. Gather the tools needed to perform this job. Refer to the project's tools and materials list.

Note

This job contains most, but not all, steering and suspension diagnosis procedures.

- If the complaint involves the power steering system, see Job 18.
- If the complaint involves ride height or alignment, see Job 28.
- For wheel- and tire-related problems, see Job 29.

Initial Diagnosis

IV.A.2

☐ 1. Obtain a description of the problem from the vehicle operator.

Problem as described by the operator: _____

_____

_____

☐ 2. Obtain the proper service literature for the vehicle.

☐ 3. Check ride height according to manufacturer's procedures and record the results below. Indicate the units of measurement.

Left Front

Specification: _____ inches/mm

Actual: _____ inches/mm

Right Front

Specification: _____ inches/mm

Actual: _____ inches/mm

Left Rear

Specification: _____ inches/mm

Actual: _____ inches/mm

Right Rear

Specification: _____ inches/mm

Actual: _____ inches/mm

Does any ride height measurement exceed the manufacturer's specifications? Yes ☐ No ☐

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Project 3: Job 8—Diagnose Steering and Suspension Problems *(continued)*

☐ 4. Road test the vehicle to duplicate the original complaint.

Describe abnormal sounds and indicate the conditions under which they occur: _____

_____

_____

_____

IV.C.1

Describe any vibrations, shocks or bumping/looseness sensations, body sway on turns or at cruising speeds, wander or loose sensation at cruising speeds, or sensations of harshness and the conditions under which the problems occur: _____

IV.C.1

_____

_____

_____

Did the road test confirm that the problem described by the operator exists? Yes ☐ No ☐

If the answer to the question in steps 3 or 4 is Yes, go to step 5.

If the answer is No, discuss your findings with your instructor before proceeding.

☐ 5. Raise the front of the vehicle so the front suspension is correctly suspended for checking the ball joints. Make sure the steering linkage is free to turn.

IV.C.5

Warning

Raise and support the vehicle in a safe manner. Always use approved lifts or jacks and jack stands.

☐ 6. Shake each front wheel and note any looseness.

a. Grasp the wheel at the top and bottom and shake it in and out to check the suspension parts. See **Figure 8-1**.

Does the right wheel feel loose? Yes ☐ No ☐

Does the left wheel feel loose? Yes ☐ No ☐

b. Grasp the wheel at the front and back and shake it back and forth to check the steering linkage parts, **Figure 8-2**.

Does the right wheel feel loose? Yes ☐ No ☐

Does the left wheel feel loose? Yes ☐ No ☐

c. On MacPherson strut vehicles with the upper part of the strut angled toward the rear of the vehicle, grasp the wheel at approximately 45° from the top and bottom and shake it in and out to check the suspension.

Does the right wheel feel loose? Yes ☐ No ☐

Does the left wheel feel loose? Yes ☐ No ☐

☐ 7. Have a helper shake each front wheel while you observe the front suspension.

Were any parts loose? Yes ☐ No ☐

If Yes, list them in the following blanks.

Front left side: _____

_____

Front right side: _____

_____

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Figure 8-1. When checking for loose suspension parts, grasp the wheel at the top and bottom, and try to shake it. Slight movement is normal.

Figure 8-2. When checking the steering linkage for looseness, try to move the wheel back and forth.

IV.C.5
IV.C.6
IV.C.7
IV.C.8
IV.C.9
IV.C.10
IV.D.1

Check Suspension Parts

☐ 1. Check all front suspension parts for damage and complete the following chart. Write "NA" in the first blank when the part is not used on the vehicle you are checking.

	Passed	Worn/Loose	Bent/Broken	Leaking
Upper ball joints:	_____	_____	_____	_____
Upper control arms:	_____	_____	_____	_____
Lower ball joints:	_____	_____	_____	_____
Lower control arms:	_____	_____	_____	_____
Control arm bushings:	_____	_____	_____	_____
Steering knuckle:	_____	_____	_____	_____

(Continued)

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Project 3: Job 8—Diagnose Steering and Suspension Problems *(continued)*

(Continued)	Passed	Worn/Loose	Bent/Broken	Leaking
Strut rod:				
Strut rod bushings:				
Stabilizer bar bushings:				
Shock absorbers:				
Strut cartridges:				
Springs/torsion bars:				
Fasteners:				
Frame/subframe:				

☐ 2. Obtain a dial indicator and use it to check ball joint play.

Note

Checking ball joint play may not be necessary on the vehicle you are servicing. Check with your instructor.

Specified maximum ball joint play: _____

Actual ball joint play: _____

Is ball joint play within specifications? Yes ☐ No ☐

☐ 3. If not already done, raise the rear of the vehicle so the rear suspension parts can be checked.

Warning

Raise and support the vehicle in a safe manner. Always use approved lifts or jacks and jack stands.

☐ 4. Check all rear suspension parts for damage and complete the following chart. Write "NA" in the first blank when the part is not used on the vehicle you are checking.

	Passed	Worn/Loose	Bent/Broken	Leaking
Upper ball joints:				
Upper control arms:				
Lower ball joints:				
Lower control arms:				
Strut rod:				
Strut rod bushings:				
Stabilizer bar:				
Stabilizer bar bushings:				
Shock absorbers:				
Strut cartridges:				
Springs/torsion bars:				
Fasteners:				
Axle:				

IV.C.11

IV.D.1

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☐ 5. If the vehicle is equipped with rear lower ball joints, check them for looseness as specified by the service manual.

Specified maximum ball joint play: _____

Actual ball joint play: _____

Is ball joint play within specifications? Yes ☐ No ☐

Check Steering Parts

☐ 1. Check the steering linkage, steering gear, and steering shaft for damage. Complete the following chart. Write "NA" in the first column when the part is not used on the vehicle you are checking.

IV.B.3 IV.B.4 IV.B.5 IV.B.6 IV.B.16 IV.B.17 IV.B.18

	Passed	Worn/Loose	Bent/Broken	Leaking
Steering arms:				
Outer tie rod ends:				
Inner tie rod ends:				
Pitman arm:				
Idler arm:				
Relay rod/drag link:				
Steering gear:				
Steering coupler:				
Steering shaft:				
Power steering pump:				
Power steering belt:				
Power steering hoses:				
Fasteners:				

☐ 2. If necessary, check the rear steering linkage for damage. Complete the following chart. Write "NA" in the first column when the part is not used on the vehicle you are checking.

	Passed	Worn/Loose	Bent/Broken	Leaking
Steering arms:				
Outer tie rod ends:				
Inner tie rod ends:				
Steering gear:				
Power steering hoses:				
Hydraulic valves:				
Electrical controls:				
Fasteners:				

Complete Diagnosis and Perform Service

☐ 1. Discuss with your instructor the results obtained in the preceding charts. Determine which suspension and steering parts are defective.

List the defective parts: _____

_____

_____

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☐ 2. After obtaining your instructor's approval, make needed repairs based on your front and rear suspension inspections.

What repairs were made? _____

_____

_____

_____

☐ 3. Recheck the condition of the suspension and steering system. If the problem has been corrected, go to step 4. If the problem still exists, repeat the procedures in this job until the problem is located and corrected.

☐ 4. Return all tools and equipment to storage.

Job Wrap-Up

☐ 1. Clean the work area.

☐ 2. Did you encounter any problems during this procedure? Yes ☐ No ☐

If Yes, describe the problems:_____

_____

What did you do to correct the problems? _____

_____

☐ 3. Have your instructor check your work and sign this job sheet.

Performance Evaluation—Instructor Use Only

Did the student complete the job in the time allotted? Yes ☐ No ☐

If No, which steps were not completed? _____

How would you rate this student's overall performance on this job?_____

1–Excellent, 2–Good, 3–Satisfactory, 4–Unsatisfactory, 5–Poor

Comments: _____

_____

_____

INSTRUCTOR'S SIGNATURE _____

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